

FORT DETRICK



FACILITIES

FEBRUARY 1971

FORT DETRICK

FACILITIES

I. GENERAL

a. Real Estate

1. Area - Fort Detrick occupies 1220 government owned acres (plus 10 acres utilities easement). Of this most is utilized for research and support activities, housing and tenant facilities including the U.S. Army Medical Research Institute of Infectious Diseases, a U.S. Army Reserve Armory, a Signal Corps Communications Center and a U.S. Navy Unit. About 60 acres of open farm land is currently on short term lease to local farmers.

2. Buildings:

<u>Type</u>	<u>Structures</u>	<u>Square Feet</u>
Temporary	96	305,506
Semi-Permanent	77	299,731
Permanent	<u>293</u>	<u>1,624,988</u>
	466	2,230,225

3. Value

(a) Book Value of Land, Building and Equipment,

28 February 1971 \$98,000,000.

(b) Replacement Value Updated to

28 February 1971 \$190,000,000.

4. Miscellaneous: In addition to research, support and tenant facilities, Fort Detrick also contains facilities normal to a U.S. Army Base including 156 permanent family housing units, BOQ, EM Barracks, Chapel, Library, Day Care Center, Nursery School and Kindergarten, Cafeteria, Credit Union, Theater, Bowling Lanes, Gymnasium, Swimming Pool, Recreation Fields, Craft Shops, Post Exchange, Officer and EM Clubs,

a Medical Dispensary which is scheduled to be relocated in a 100,000 square foot addition to USAMRIID currently under construction and a Helicopter Landing Pad.

b. Laboratory Building Design:

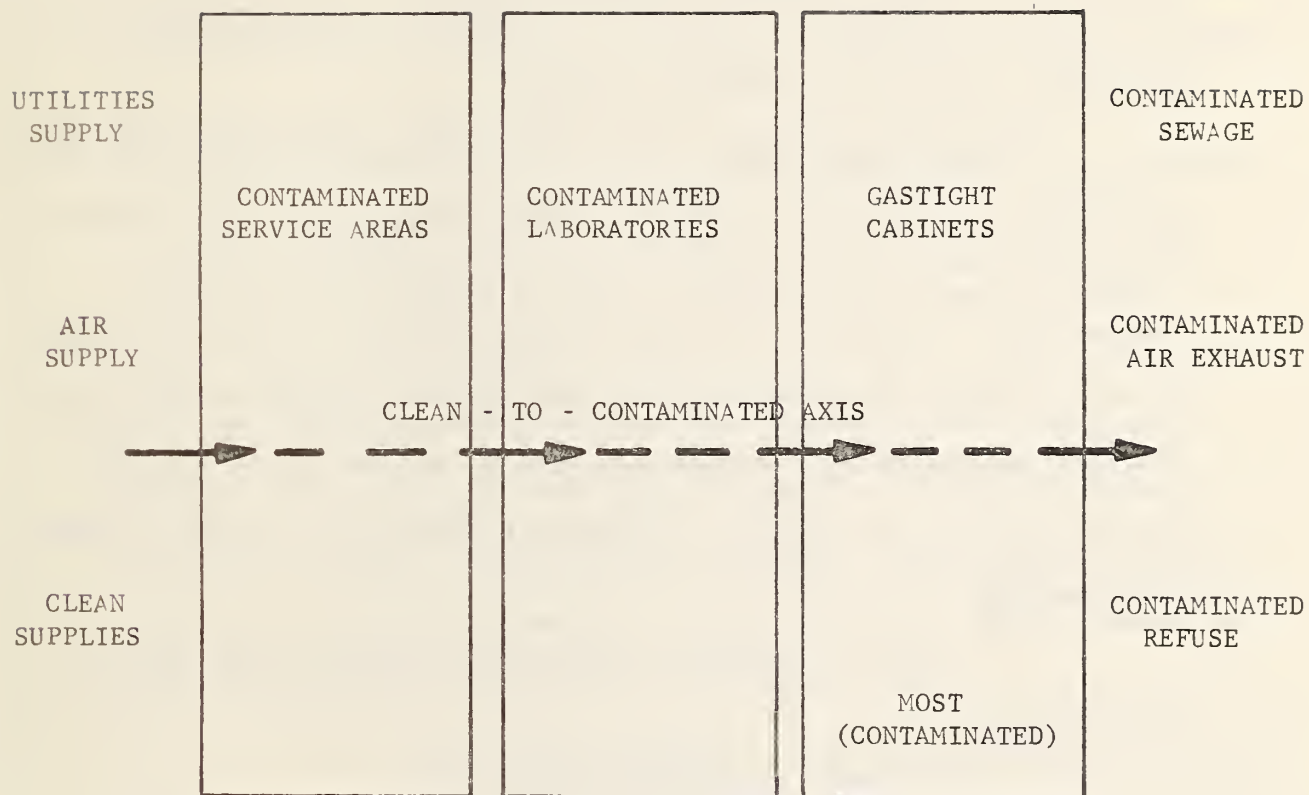
Figure 1 illustrates the basic approach in a simplified manner. The boxes enclose isolated areas of different levels of infectious risk. These areas may be suites of rooms, single rooms, or the space within a gastight cabinet. Means must be provided for movement between these zones - movement of men, animals, equipment, air, liquids - without permitting the passage of microorganisms. As indicated by the arrows, movement is directed along a clean-contaminated axis, in the direction of increasing hazard.

The approach outlined in Figure 1 involves the application of the following principles of control:

1. The building is divided into contaminated and non-contaminated areas, and the contaminated area is sub-divided into areas of different degrees of contamination.

2. Barriers such as biological safety cabinets, ultra-violet air locks, change rooms, sterilizers, and disinfectant showers are provided between contaminated and non-contaminated areas, and between areas of different degrees of contamination.

3. Ventilation air movement is always from less contaminated to more contaminated areas, and the air is never recirculated. The exhaust air is filtered before discharge to atmosphere.



BASIC APPROACH TO BIOLOGICAL SAFETY DESIGN
FIGURE NO. 1

4. Personnel and materials are decontaminated before leaving contaminated areas.

5. Materials of construction, surface finishes, and design features are selected for ease and effectiveness of decontamination and to provide effective biological barriers.

c. Construction Costs: Construction costs of biological laboratory buildings vary from \$60 to \$100 per square foot of gross floor space as compared to about \$40 per square foot for institutional chemistry laboratories. Costs vary with relation to the size of the facility and are high because of the special requirements for utilities, room finish, sealants and corrosion resistant materials. An analysis of the space distribution for 10 laboratory buildings indicates the following average distribution:

65% is available for direct and indirect labor use (net floor space):

24% - laboratory space

19% - direct support space such as glassware washing, incubator, refrigeration, animal rooms, greenhouses, preparations, etc.

43% - "working space"

22% - secondary support, such as change rooms, corridors, offices, storage space, conference rooms, etc.

35% is attic and basement space which contains utility systems. Note that of any major area, walls and partitions will reduce

the actual available space by about 15%.

d. Special Equipment:

1. Biological Safety Cabinets: Many of the laboratories at Fort Detrick are equipped with biological safety cabinets or systems of cabinets which are designed to permit investigators to work with hazardous materials without exposing themselves. Class I cabinets are in effect biological "fume" hoods where room air is drawn into the cabinet past the operator, over the working space then exhausted through a system of filters. Class III cabinets or "Glove Boxes" are gas tight enclosures which are operated through rubber gloves and a system of pass boxes and autoclaves designed to completely contain hazardous materials. The Class III systems are maintained at negative pressure by limiting the amount of filtered room air which enters them. Cabinet exhaust is filtered and incinerated.

2. Processing Equipment: Biological processing equipment such as fermentors and piping systems which are not contained in Class III cabinet systems are also freon tested and are operated under a system of steam seals, break tanks and filters which are designed to contain biologicals within the systems. In addition, biological research equipment such as shakers, water baths, centrifuges, freeze dryers, etc. has been modified so that it can be incorporated into Class III cabinet systems.

e. Utilities: General

1. Steam - Central Steam Plant

(a) Capacity: 7,000,000 lbs/day

(b) Usage: Summer 1,200,000 lbs/day

Winter 3,000,000 lbs/day

2. Water - Government owned filtration plant on Monocacy River.

(a) Capacity: 4,250,000 gal/day

(b) Usage: Summer 2,500,000 gal/day

Winter 1,500,000 gal/day

3. Sanitary Sewage - Government owned treatment plant on Monocacy River.

(a) Capacity: 1,500,000 gal/day

(b) Usage: Summer 970,000 gal/day *

Winter 770,000 gal/day *

* Includes material from contaminated sewage treatment Plant which is re-treated.

4. Electricity - Commercial, Potomac Edison Co.

(a) Capacity: 20,000 KVA at 34.5 KV

(b) Usage: Summer 12,000 KVA

Winter 6,000 KVA

Note: Alternate emergency route exists at reduced capacity.

f. Utilities: Special

1. Contaminated Sewage Treatment, Bldg. 375: All potentially contaminated liquid waste from research laboratory buildings is collected

by an independent concrete encased underground sewage system, stored in tanks(750,000 gal. capacity), steam sterilized at 280⁰F for 20 minutes then pumped to the sanitary sewage plant.

(a) Capacity - 1,152,000 gal/day

(b) Usage - Summer 340,000 gal/day

Winter 315,000 gal/day

2. Contaminated Air Incineration: Air and gases from high biological hazard areas such as safety cabinet systems, test chambers and exposed animal holding rooms are heat sterilized at 650⁰F in incinerators ranging in capacity from 16 SCFM to 2500 SCFM, large volume (2500 SCFM) incinerators are located at Buildings 376, 313, 520 and 1414.

3. Contaminated Solid Waste Disposal: All potentially contaminated solid waste material is sterilized prior to leaving the laboratory facility and then incinerated at Building 539. The incinerator has a capacity of 4000 lb/hr. Noncombustibles are buried in a sanitary landfill located in a remote location on the Post.

g. Utilities: Building.

1. Heating, Ventilating and Air-Conditioning: All laboratory buildings are air-conditioned with 100% make-up air systems. Fresh air is drawn into the building, conditioned, and delivered to the laboratory areas. Separate exhaust systems remove the air which passes through a double system of high efficiency biological filters prior to leaving the building.

2. Water: Each laboratory building is supplied water from the central system but protected from the central system by break tanks or back flow preventors to prevent cross contamination. Most buildings also have central distilled water systems and some have central deionized water systems.

3. Air, Gas and Vacuum: Laboratory buildings generally have separate compressed air and vacuum systems to serve contaminated and noncontaminated laboratories. Vacuum drawn from potentially contaminated laboratories is either filtered or incinerated prior to discharge to the atmosphere. Laboratory buildings are supplied with gas from an underground distribution system or cylinder manifolds.

h. Shops and Miscellaneous Support Facilities:

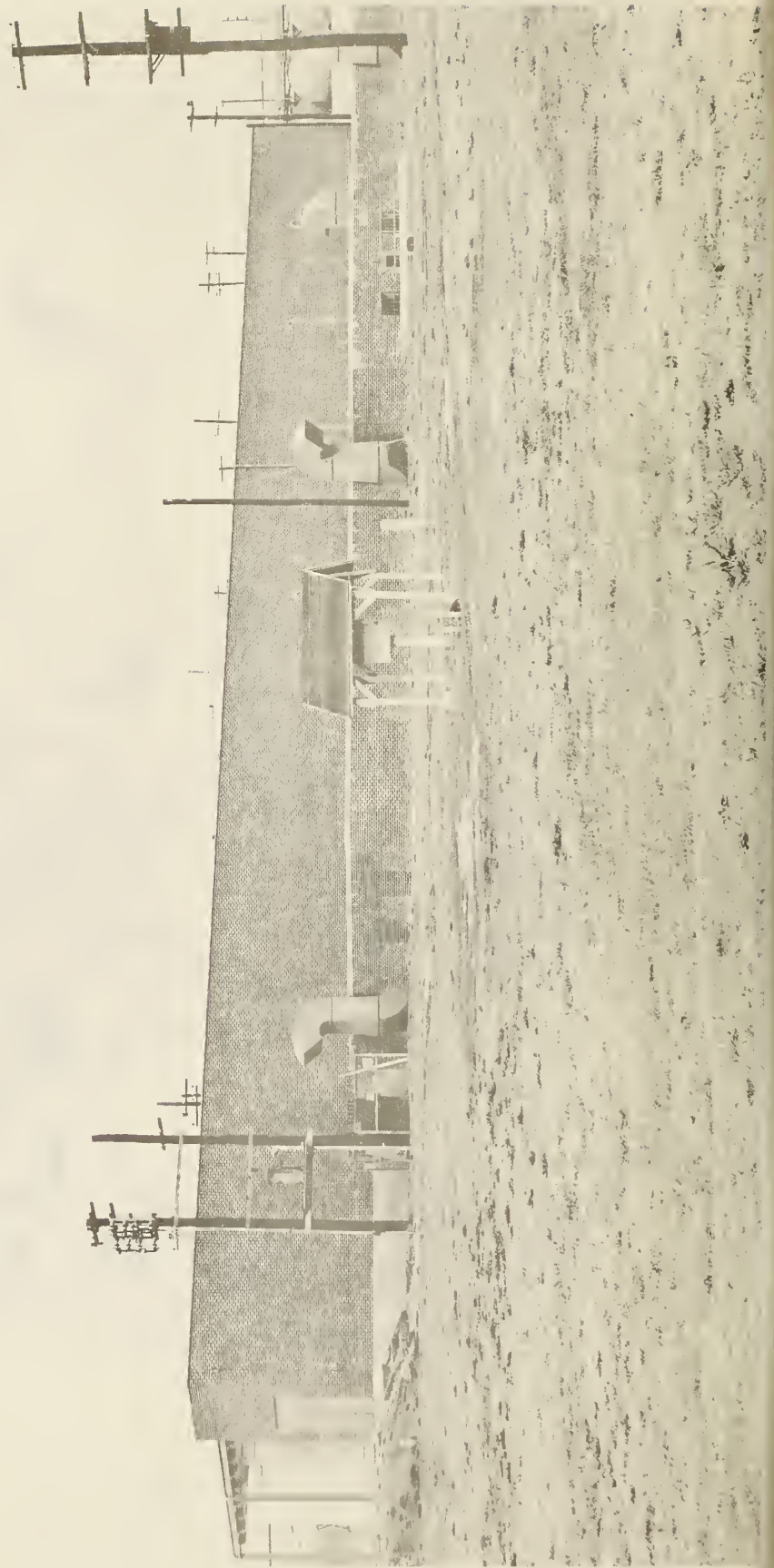
1. Shops - Fort Detrick is equipped with a variety of shops whose primary function is the maintenance of laboratory buildings and equipment. These shops include electric, instrument, millwright, refrigeration, carpenter, masonry, sign, paint, pipe, weld, sheetmetal, machine, model, plastic, glass, scientific instrument, labor and roads and grounds. In addition, several of the laboratories are equipped with limited facilities for in-house work.

2. Laundry - Personnel entering potentially contaminated laboratories are required to change into laboratory garments prior to entering. Upon leaving, the clothing is removed in change rooms, sterilized and sent to the central laundry for cleaning and repair. Seamstresses at the Laundry are available to fabricate special articles.

3. Warehouses - The central warehouse stores and distributes a variety of laboratory, maintenance and office supplies. Additional warehouses are used for storage of bulk supplies and standby equipment.

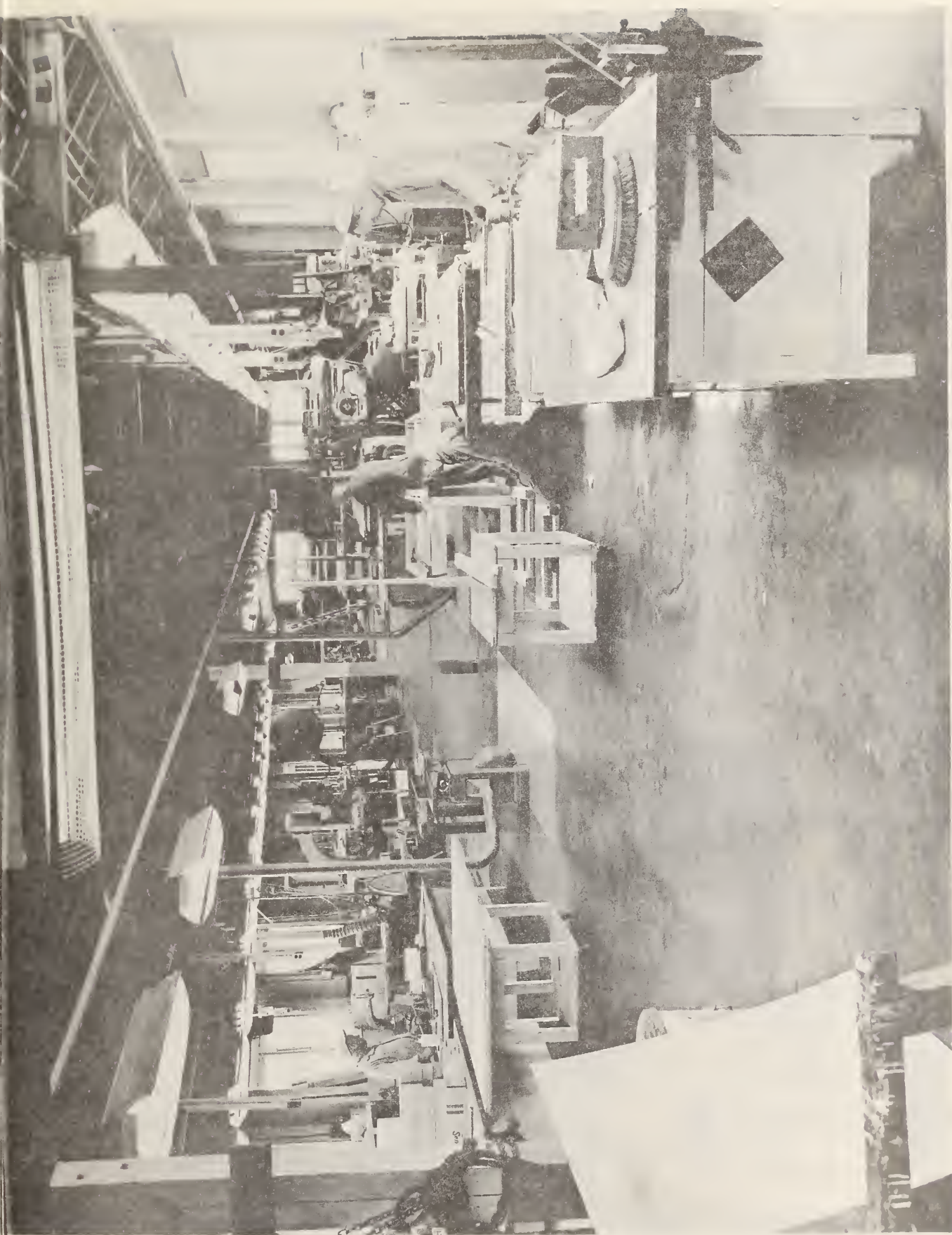
4. Motor Pool - In addition to the various types of vehicles utilized by the Maintenance Shops, the Motor Pool and its associated service garage maintains and makes available sedans, limousine service buses and a variety of trucks from 1/2 ton pickups to semi-trailers.

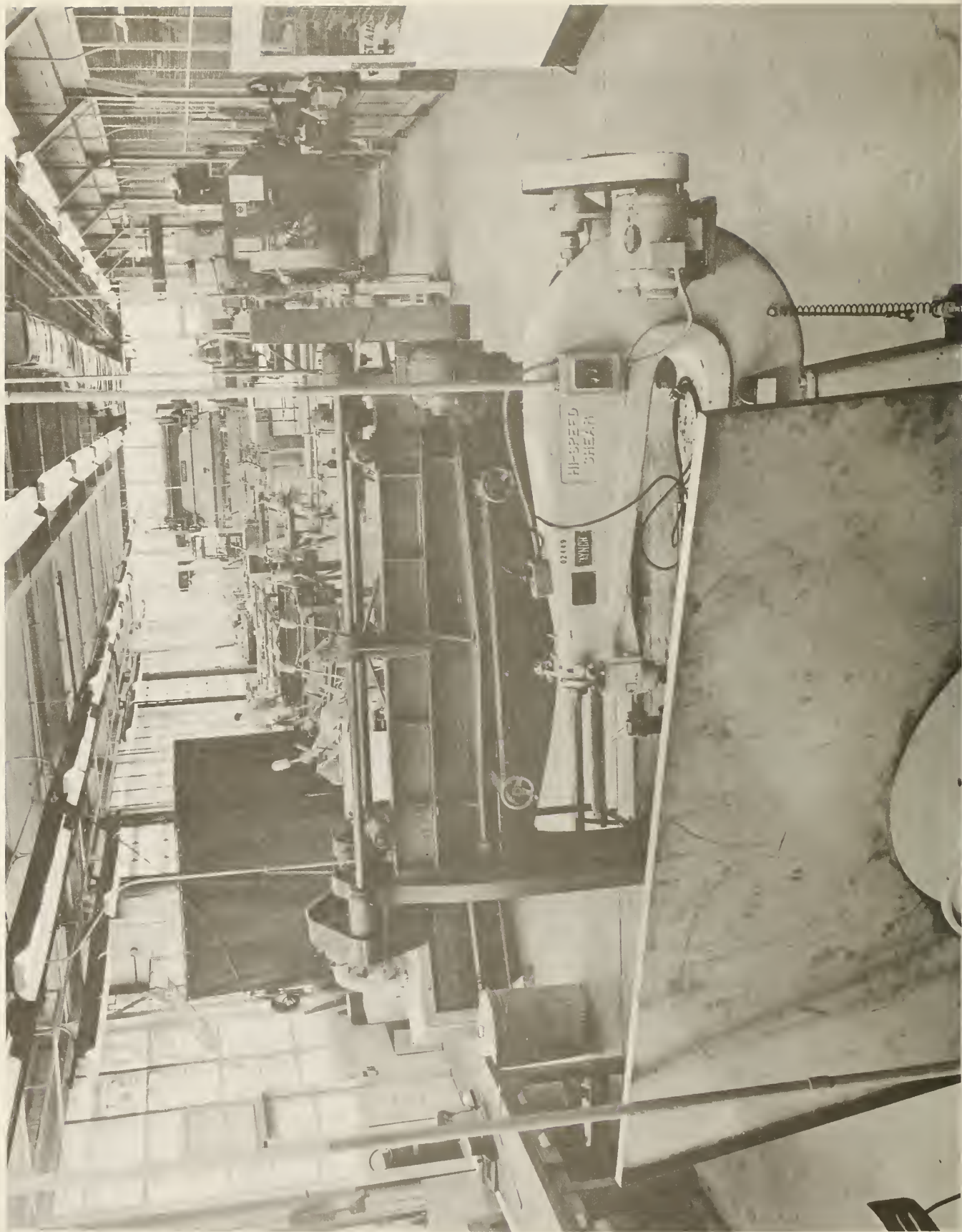












BUILDING 560

This structure houses the laboratories for research on bacteria, fungi, and mammalian cell lines. It consists of two levels of laboratories in three wings, arranged so that there are six independent laboratory sections. Each section contains supporting shower and change rooms, animal holding facilities, cold rooms, incubators, dishwashing and storage facilities. All laboratories are designed to permit the most infectious pathogens to be studied safely. The laboratories are presently equipped to perform the following functions:

Microbial genetics

Microbial nutrition

Microbial physiology

Small animal pathogenesis

Small animal therapy

Immunology

In addition to the usual equipment found in infectious disease laboratories, the building contains two auxiliary rooms of Class III hoods, 38' x 22' in size, 5 instrument laboratories for general use and a dynamic aerosol exposure apparatus.

Each of the six independent laboratory sections contain 28,400 ft². The building is subdivided into 40 suites; each of which, depending on the size, can handle from two to four technical personnel. The forty suites are set up in the following manner: 28 bacteriology, 7 biochemistry, 5 instrument.

Building Area - 170,000 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG 560, Wing 1
First Floor

No. of Units	Facility Unit	Maximum Staff per Unit
1	Biochemistry Laboratory	2
1	Biochemistry Laboratory	4
3	Bacteriology Laboratory	<u>3</u>
Total		15
Significant Support Equipment:		
1	Class III Hoods System 38' x 22'	

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG 560,
Wing 1, Second Floor

No. of Units	Facility Unit	Maximum Staff per Unit
4	Bacteriology Laboratory	3
2	Bacteriology Laboratory	<u>4</u>
Total		20

Significant Support Equipment: None

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, Bldg. 560
Wing 2, First Floor

No. of Units	Facility Unit	Maximum Staff per Unit
4	Bacteriology Laboratory	3
1	Bacteriology Laboratory	2
1	Biochemistry Laboratory	4
2	Biochemistry Laboratory	<u>2</u>
Total		22
Significant Support Equipment:		
5	Instrument Laboratory	

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 560
Wing 2, Second Floor

No. of Units	Facility Unit	Maximum Staff per Unit
2	Bacteriology Laboratory	4
2	Bacteriology Laboratory	3
1	Bacteriology Laboratory	2
1	Biochemistry Laboratory	<u>2</u>
Total		18

Significant Support Equipment:

Dynamic Aerosol Facility (22-17)

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 560
Wing 3, First Floor

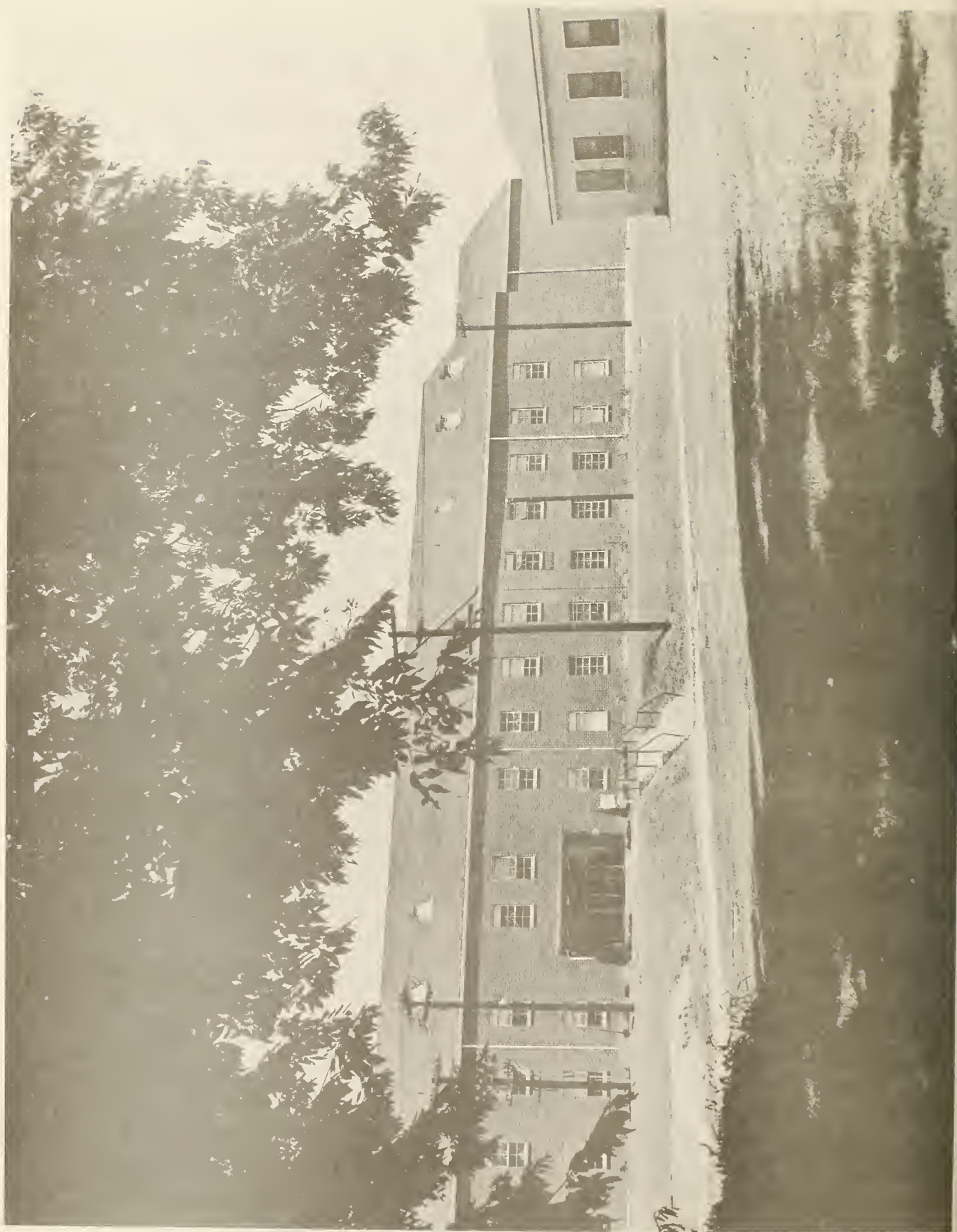
No. of Units	Facility Unit	Maximum Staff per Unit
2	Bacteriology Laboratory	2
3	Bacteriology Laboratory	3
1	Biochemistry Laboratory	<u>4</u>
Total		17
Significant Support Equipment:		
1	Class III Hood System, 38' x 22'	

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT BLDG. 560,
Wing 3, Second Floor

No. of Units	Facility Unit	Maximum Staff per Unit
4	Bacteriology Laboratory	<u>4</u>
	Total	16

Significant Support Equipment: None

Total for Bldg 86



BUILDING 539

This facility is a 2-story, microbiological laboratory building of concrete block and steel construction of approximately 100,000 square feet total, excluding a large incinerator that is used post-wide but is contiguous with the laboratory building. The facility contains 16 laboratory suites especially designed and ventilated for conducting microbiological research of broad scope on infectious microorganisms, particularly viruses and rickettsiae. In addition to customary microbiological research equipment, the laboratory area contains special items of equipment used in support of virological research such as: incubators for embryonated eggs, ventilated cabinets for work with infectious agents, electron microscope, analytical and preparative ultracentrifuges, moving-boundary electrophoresis apparatus, liquid scintillation counter, aerosol generator (Henderson type) and its ventilated enclosure, recording spectrophotometers and mechanical and dry ice freezer units. Ancillary to the laboratory facilities and equipment, approximately 50 percent of the total space is utilized for care and housing of infectious or normal laboratory animals. Approximately 10 percent of the animal-holding space is equipped with special ventilation and cages to house highly infectious animals. The building is also equipped with utility spaces, offices, receiving and glassware preparation areas, shower and change room facilities and autoclaves all designed and appropriately located for the maximum safety of personnel engaged in work with infectious agents.

The following functions currently are performed in this laboratory complex:

Collection and maintenance of viral and rickettsial etiological agents.

Development of antigens from viral and rickettsial pathogens.

Nutrition of viral and rickettsial agents.

Genetics of V and R agents.

Rapid assay and identification of strains.

Viral replication.

Purification of viruses.

Complete modification of one building wing (cost \$1,600,000) is substantially finished, which will provide complete Class III Laboratories in this wing.

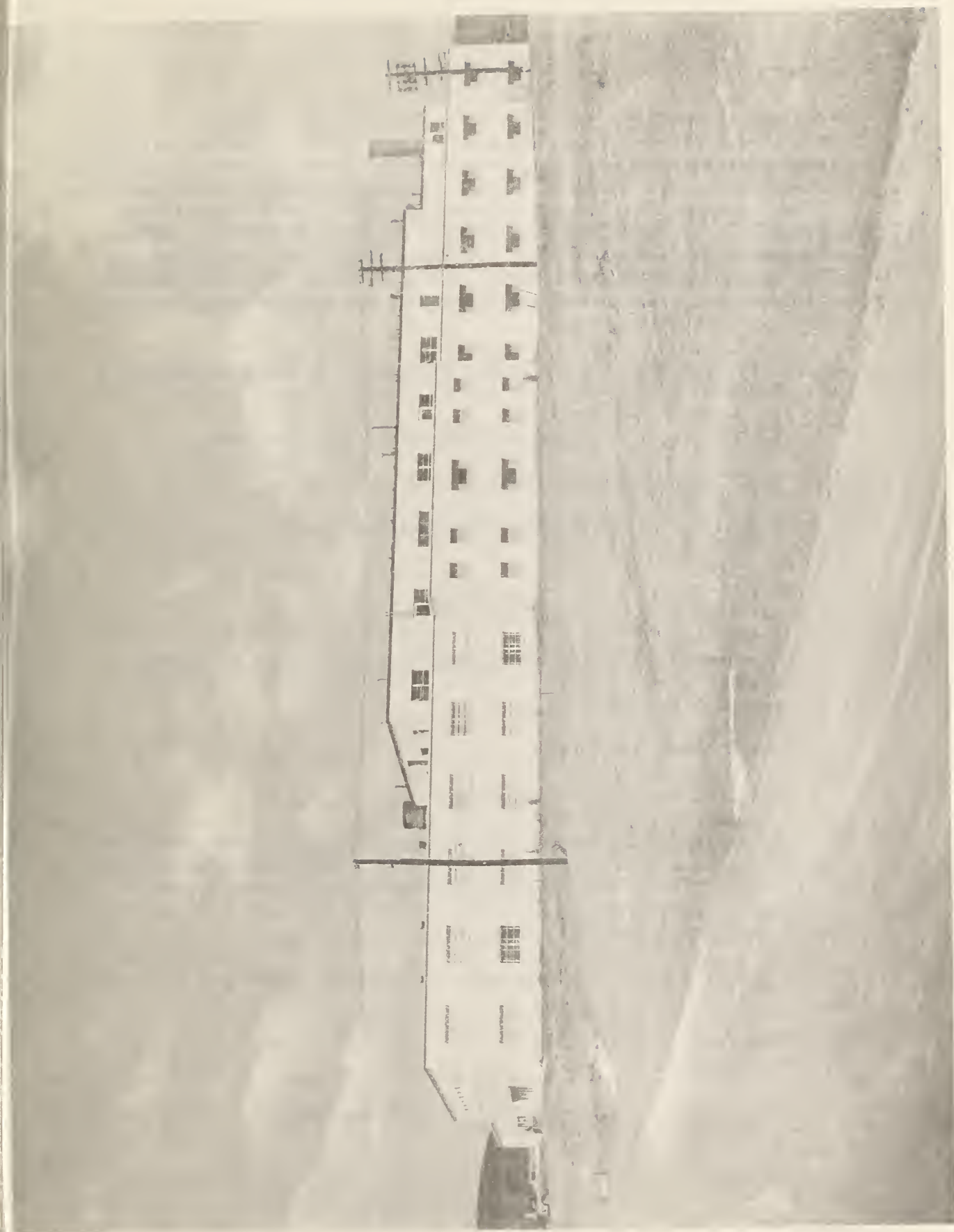
Building Area - 117,000 Ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 539

No. of Units	Facility Unit	Maximum Staff per Unit
3	Virology Laboratory	1
7	Virology Laboratory	2
1	Virology Laboratory	3
8	Virology Laboratory	4
2	Virology Laboratory	6
3	Radiology Laboratory	<u>2</u>
Total		70

SIGNIFICANT SUPPORT EQUIPMENT:

1	Dynamic Aerosol Apparatus
28	Large Animal Isolation Rooms



BUILDING 538

This is a modern structure designed primarily for physical science laboratories but since modified slightly to contain medical specialty laboratories. It contains the most diverse assembly of laboratories at Fort Detrick. All are properly equipped to study infectious pathogens. It contains biochemistry, physical chemistry, organic and analytical laboratories; biophysics, radiology, fluorescence microscopy, electron microscopy, electrophoresis, and electronics laboratories; immunopathology, histology, histochemistry, serology, autopsy and surgery rooms.

At the present time the following functions are being performed in this laboratory complex:

Chemical structure and activity of bacterial toxins.

Chemiluminescent reactions.

Biophysics of thin films and membranes.

Ecology.

Epidemiology.

Development of antigens to protect Fort Detrick personnel.

Animal histopathology.

Animal immunopathology.

Predictive models of disease.

Special equipment includes: Phoenix Amino Auto Analyzer, Beckman Analytical Ultracentrifuge, Electrophoresis Apparatus, RCA Electron Microscope, Turner Absolute Spectrofluorometer, Sorval Automatic Superspeed Refrigerated Centrifuge, Brinkman Continuous Free Flowing Electrophoretic Separator.

Total building area including support facilities consists of 64,200 square feet.

Building Area - 65,000 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 538

No. of Units	Facility Units	Maximum Capacity Per Unit
1	Biochemistry Laboratory	2
7	Biochemistry Laboratory	3
2	Biochemistry Laboratory	4
1	Physical Chemistry Laboratory	2
1	Biophysics Laboratory	2
1	Biophysics Laboratory (suite)	5
1	Organic Chemistry Laboratory	3
1	Analytical Chemistry Laboratory	4
1	Radiology Laboratory	2
1	Immunopathology Laboratory	2
1	Histology Laboratory	8
1	Histochemistry Laboratory	1
1	Serology Laboratory	4
9	Microscopy Laboratory	2
1	Microbiology Laboratory	3
1	Tissue Culture Laboratory	2
1	Virology Laboratory	4
Total		88

SIGNIFICANT SUPPORT EQUIPMENT:

1	Surgery Room
1	Chromotography Laboratory

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No. of Units	Facility Units	Maximum Capacity per Unit
SIGNIFICANT SUPPORT EQUIPMENT: -- continued:		
1	Fluorescence Microscopy Laboratory	
2	Electron Microscope	
1	Electrophoresis Laboratory	
1	Electronics Instrument Laboratory	
1	Ultra centrifuge Laboratory	
3	Autopsy Laboratory	

BUILDING 568

This structure was originally designed for surveillance of metals, plastics and other materials of construction in a controlled environment with passing time. It is therefore not properly equipped to study pathogens. The building has since been modified to provide aerosol physics laboratories and offices. It contains six (6) capsules, with supporting laboratories, for the study of aerosols which are not harmful to man.

The following functions are currently being performed in these laboratories:

Elicitation of fluorescence from biological aerosols.

Hydration and dehydration of microorganisms in aerosol.

Adjuvants in relation to decay of biological aerosols.

Building Area - 50,000 ft².

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 568

No. of Units	Facility Unit	Maximum Staff per Unit
1	Chemistry Laboratory, Clean	4
6	Aerobiology Capsules, 1660 l, Clean	3
1	Radiological Laboratory	6
1	Aerosol Physics Laboratory, Clean	2
1	Aerosol Physics Laboratory, Clean	3
1	Aerosol Physics Laboratory, Clean	4
1	Aerobiology Capsule, 20,000 l, Clean	3
1	Entomology Production Laboratory	<u>1</u>
Total		41

Significant Support Equipment: None

BUILDING 505

This is an old building which now contains seven biochemistry laboratories. They are not equipped for work with human pathogens. The laboratories are being used for evaluation of disinfectants.

Building Area - 3,880 Ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 505

No. of Units	Facility Unit	Maximum Staff per Unit
5	Biochemistry Laboratories, Clean (disinfectants)	2
2	Biochemistry Laboratories, Clean (disinfectants)	<u>3</u>
		Total
		16

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 243

This building was constructed in 1944-45. It is no longer suitable for work with human pathogens. It contains seven bacteriology laboratories now used for assay of harmless saprophytes used as simulants of pathogens.

Building Area - 6,550 Ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 243

No. of Units	Facility Units	Maximum Staff per Unit
7	Bacteriology Laboratory, Clean	<u>2</u>
		Total
		14

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 1412

Building 1412 is unique in containing all of the facilities necessary to accomplish special tasks quickly. The structure contains 70,000 square feet of space and includes microbiology, toxicology and engineering laboratories, four aerosol chambers with associated animal holding areas, and a machine shop. With the exception of certain support areas, the entire building, including shops and engineering labs, is designed to permit safe handling of human pathogens.

The following functions are being performed in Building 1412:

Aerosolization of human and animal pathogens.

Vulnerability tests of public buildings and structures to aerosols of pathogens.

Vulnerability tests of public utilities to contamination with human pathogens.

Special studies of probable effect of human and animal epidermis on social and economic structures.

A large volume air incinerator (2500 SCFM) is located in Building 1414 adjacent to and for Building 1412.

Building Area - 70,000 ft².

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 1412

No. of Units	Facility Unit	Maximum Staff per Unit
6	Microbiology Laboratory	5
4	Toxicology Laboratory	2
1	Weapons Engineering Laboratory	6
1	Weapons Engineering Laboratory	3
1	Aerosol Chamber, 21-foot (not suitable for pathogens)	8
1	Aerosol Chamber, 33-foot	8
2	Aerosol Chamber, 8-foot	<u>8</u>
Total		89

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 376

This building contains several specialized facilities for safely studying aerosols of pathogenic microorganisms. Aerosol facilities are also located in several other buildings at Fort Detrick. Building 376 contains the following types of equipment:

- a. A 550-liter Reyniers' Chamber capable of being maintained at temperatures between 25° and 125°F and at relative humidities between 10 and 95 per cent of saturation.
- b. A 550-liter Reyniers' Chamber capable of maintaining a desired temperature between -60° and 100°F and a relative humidity between 10 and 95 per cent of saturation.
- c. Three 2500-liter Rotating Drum Chambers, capable of maintaining a desired temperature between 40 and 100°F and a relative humidity between 20 and 95 per cent of saturation.
- d. A 500-liter chamber capable of being maintained at desired temperatures between 40° and 100°F and at relative humidities between 20 and 95 per cent of saturation.
- e. A 700-liter Sunlight Drum, capable of being maintained at desired temperatures between 20° and 100°F and relative humidities between 10 and 95 per cent of saturation in light intensities up to 2 calories per Cm²/minute from a xenon arc.
- f. A Dynamic Aerosol Animal Exposure Unit capable of being maintained at any desired temperature between 40° and 95°F, at RH between 10 and 95 per cent of saturation and in sunlight at intensities of about 75 per cent of ambient intensity.
- g. A 20-liter Narrow Spectrum Chamber with some capabilities as f. above but with capacity to provide sunlight intensity about 300 per cent of ambient intensity in selected wave length band widths of about 30 millimicrons.

In addition to these specialized aerosol containment facilities, there are adequate supporting laboratories to safely handle viral, rickettsial and bacterial pathogens. A mobile laboratory is maintained in connection with this facility for exposure of volunteers to controlled aerosols.

BUILDING 376 (Cont'd)

The following functions are presently being performed in this building:

Evaluation of vaccines in volunteers

Characterization of aerosols of pathogens

The nature and pathology of respiratory infections in laboratory animals.

Animals ranging in size from mice to Rhesus monkeys may be exposed to aerosols and safely held in isolated animal rooms.

Two large volume air incinerators (2500 SCFM) sterilize air from high risk areas and an emergency generator is available for critical power requirements.

Building Area - 39,000 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 376

No. of Units	Facility Unit	Maximum Staff per Unit
1	Solar Radiation Laboratory	5
4	Reynier Chambers, with supporting laboratories	6
7	Microbiology Laboratory	3
2	Microbiology Laboratory	<u>2</u>
Total		54

Significant Support Equipment:

1	Radiological Laboratory (Not suitable for pathogens)
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BUILDING 527

This building houses a 1,000,000-liter, Horton Sphere, welded gas-tight, with all ports protected to permit study of aerosols of pathogens. The sphere is designed to permit study of aerosols generated by explosive, single fluid, multifluid aerosol generators. The aerosol is stirred while tests are performed. There are provisions for exposure of animals or man to controlled respiratory dose of etiological agent or vaccine. This facility is unique in the free world. It would be excellent for lengthy exposure of experimental animals (or man) to controlled atmospheres of air pollutants. Air from the sphere is sterilized by a large volume air incinerator at Building 520.

Building Area - 10,500 ft².

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 527

No. of Units	Facility Unit	Maximum Staff per Unit
1	1,000,000-liter Aerosol Chamber	20

SIGNIFICANT SUPPORT EQUIPMENT: None

EXPERIMENTAL ANIMAL HOLDING LABORATORY

1. This building is under construction with completion scheduled 8 October 1970.
2. LOCATION - Sited NW of existing laboratory complex including Buildings 527 (Test Sphere aerosol facility) and 567-568 (associated laboratory facilities) and SE of major existing Medical Bacteriology laboratory, Building 560.
3. PURPOSE - A laboratory for housing experimental laboratory animals exposed to or challenged with highly infectious biological agents and their toxic products; housed animals will receive normal care and feed, be observed for signs and symptoms of infectious and toxic agent effects, receive treatment as dictated by the experimentation, and be studied in accordance with microbiological, toxicological, immunological, pharmacological, and pathological procedures.
4. SIZE AND CAPACITY
 - a. Total floor area - 36,500 ft².
 - b. Capacity = 8,000 guinea pigs or 64,000 mice or 1,000 monkeys or combinations (e.g., 4,000 guinea pigs and 500 monkeys).
5. ESTIMATED COST - \$2,151,000
6. LABORATORY FEATURES
 - a. Three animal holding rooms, each with capacity for 90 ± 10 animal cage racks, each rack with 40 individually ventilated guinea pig cages.
 - b. Includes uninfected animal receiving and preparation areas.
 - c. Facilities for cage washing, feed, bedding, and cage storage.
 - d. Support laboratories for animal necropsy and microbiological, immunological, pathological studies.

EXPERIMENTAL ANIMAL HOLDING LABORATORY (Cont'd)

7. LABORATORY REPLACEMENT OR SUPPLEMENT - Will supplement current exposed animal holding capabilities, increasing total capacity by 40 per cent.

8. STAFFING REQUIREMENTS - 32 personnel

a. Senior Microbiologist	1
b. Assistant Microbiologist	1
c. Veterinarian	1
d. Supervisory Biologist	1
e. Laboratory Technicians	7
f. Laboratory Support Workers	7
g. Animal Caretakers (1 foreman)	<u>14</u>
Total	32

Building Area - 36,500 ft²

BUILDING 567

This building contains three, intermediate size aerosol containment tanks, one 100,000-liters in volume and two 50,000-liters in volume. These three tanks are gas-tight and equipped with cabinets and all ports. Operators use rubber gloves and/or mechanical aids to insure the containment of pathogens. The temperature of the aerosol environment can be controlled to within 1°F over a range of 20 to 100°F and relative humidity controlled within one per cent over a range of 30 to 100 per cent of saturation. Animals can be exposed to controlled aerosols in these chambers and safely held for subsequent observation and test. There are adjacent facilities for chemical, histological, serological or general pathological tests and observation. Three animal holding rooms are adjacent to the aerosol tanks. Air from the tanks is sterilized by a large volume air incinerator at Building 520.

Building Area - 33,000 ft².

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 567

No. of Units	Facility Units	Maximum Staff per Unit
1	115,000-Liter Aerobiology Capsule, (suitable for pathogens)	14
1	50,000-Liter Aerobiology Capsule, (suitable for pathogens)	<u>14</u>
Total		28

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 459

This building was constructed in 1945 as a refrigerated storage area. It since has been converted to a Class III laboratory and, more recently, to an aerobiological facility. It presently contains a 5,000-liter aerosol tank with temperature and humidity control and a 1500-liter Rotating Drum aerosol container without environmental control. These aerobiological facilities and all supporting laboratories are equipped for the study of human pathogens. The facilities in this building are used to supplement those in Buildings 376, 567, 568 and 527.

Building Area - 10,000 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 459

No. of Units	Facility Unit	Maximum Staff per Unit
1	Toroid Laboratory	13
1	5000-Liter Aerosol Chamber	<u>9</u>
Total		22

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 263

This is an old, but well constructed building with concrete structure and tile walls. It is air-conditioned and used for holding monkeys. There are limited laboratory facilities. This building cannot be used for highly infectious work without extensive modifications.

The animal holding function of this building will not be required upon completion of the Central Animal Holding Building, now under construction, adjacent to Building 527.

Building Area - 14,000 ft²

PILOT PLANTS BUILDING COMPLEX 431, 470, 468, 469, 467, 434

GENERAL:

These buildings are all part of an integrated complex and as such, there is complete movement between all of the buildings. One can enter the complex through change rooms located in Bldg. 470, 467 and 468. Building 469 is a clean administrative area attached to the complex. There is visual communication between Bldg. 469 and the rest of the complex. A number of the offices in this area are set up so as to be either on the contaminated side or on the clean side of the complex.

BUILDING 467

Building 467 was designed and is equipped for process research on viral and rickettsial pathogens. There are four separate laboratory suites, one capable of containing 10 research workers. The other laboratories are smaller.

The building contains the following features: complete Class III integrity, egg incubation areas, animal holding areas, semi-pilot plant process development areas, total containment areas for centrifuging, special systems for drying and milling and grinding development work. See Bldg. 434 for associated viral and rickettsial production facilities.

Building area - 12,500 square feet.

BUILDING 468

This is a bacterial and viral process research laboratory which is accessible to the pilot plants. It contains well equipped laboratories for the study of production and processing of bacterial and viral pathogens and for tailoring products, such as vaccines, to exacting physical and biological specifications. These laboratories were designed to permit an intimate working relationship between physical and biological scientists. A number of the labs have been set up for sterile tissue culture work.

The building consists of isolated suites of rooms connected by a central hallway on two floors and special features including an electron microscope and two animal holding areas.

Building area - 38,300 square feet.

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDGS. 467-468

No. of Units	Facility Unit	Maximum Staff per Unit
1	Virology Laboratory	10
3	Bioengineering Laboratory	5
1	Bioengineering Laboratory	7
1	Bioengineering Laboratory	9
1	Engineering Laboratory	4
5	Bacteriology Laboratory	5
1	Virology Laboratory	2
1	Virology Laboratory	<u>3</u>
Total		75

SIGNIFICANT SUPPORT EQUIPMENT:

1	Class III Hood System
1	Electron Microscope
1	Machine Shop - 3-man

BUILDING 470

Building 470 was designed, equipped and operated to develop production techniques. Information gained here was used in the design of the production facility at Pine Bluff Arsenal.

This building houses an engineering laboratory for the study of oxidation-reduction potential in tissue culture production. (See Bldg. 431 for production) The building contains laboratories capable of research work with infectious material. The building also contains the following special features:

- Freeze drier facility.
- Spray drier facility.
- Development laboratories for drying.
- Specialized shops (machine, etc.).
- Infectious material storage areas.

Building area - 38,000 square feet.

FACILITY UNIT AND MAJOR SUPPORT EQUIPMENT, BLDG. 470

No. of Units	Facility Unit	Maximum Staff per Unit
1	Dryer	9
1	Tissue Culture Pilot Plant	<u>9</u>
Total		18

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 431

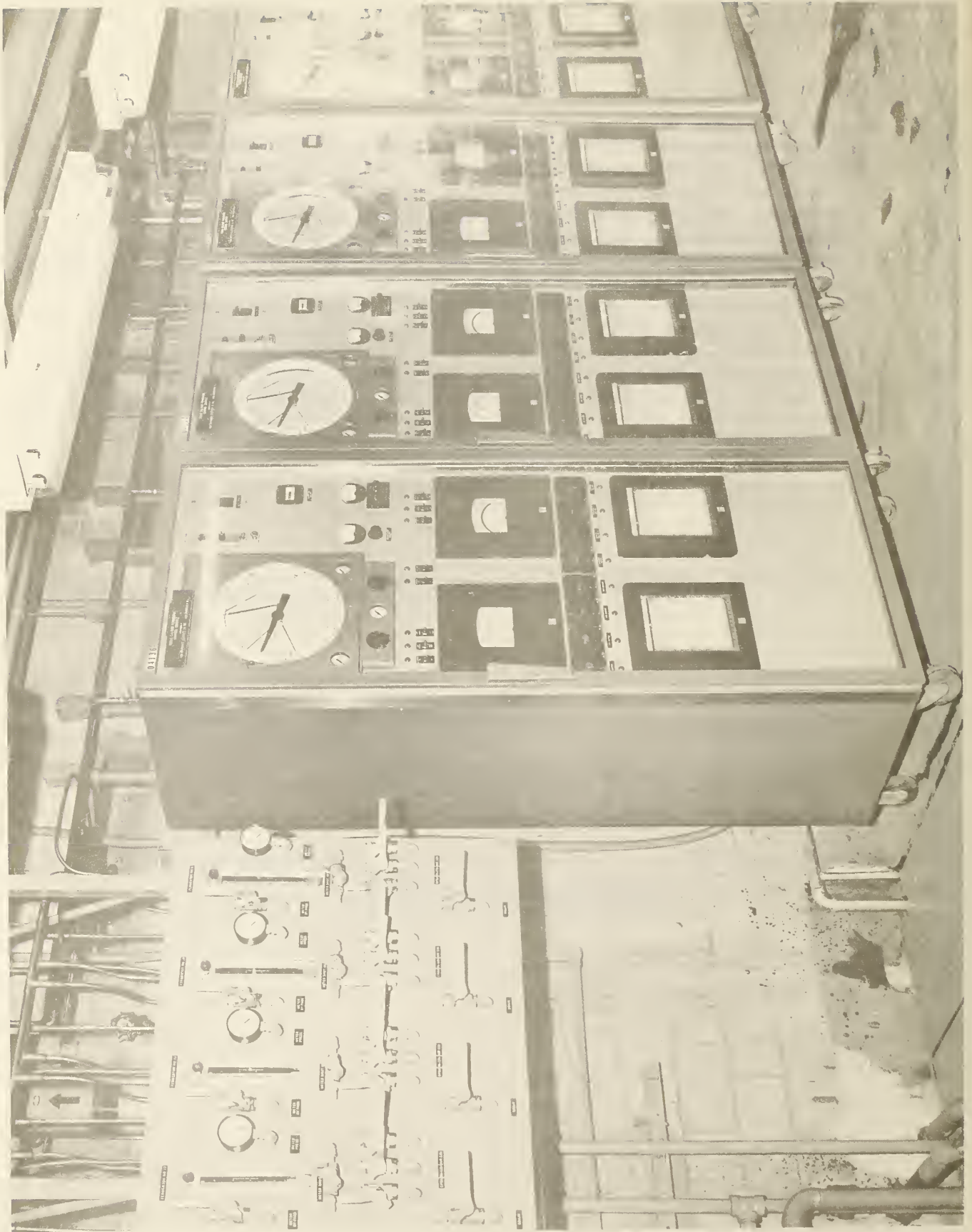
This facility contains a process research facility for study of submerged production of mammalian cell lines. It also contains eight 100 liter instrumented vessels, together with processing equipment necessary to study viral growth and infection of tissue cell lines. Support facilities include two tissue culture laboratories (with Class III) cabinets, two walk-in incubators and media prep area. This area occupies about 5,000 square feet of space. Another section of the building contains a process research facility for study of methods of production of pathogenic bacteria. It contains seven gallon fermentors and associated processing equipment, such as centrifuges, and equipment for concentration and purification of bacterial suspensions or of products of bacterial metabolism. Support facilities include control laboratories, media prep area and change rooms for personnel. This area of the building occupies an area of about 20,000 square feet.

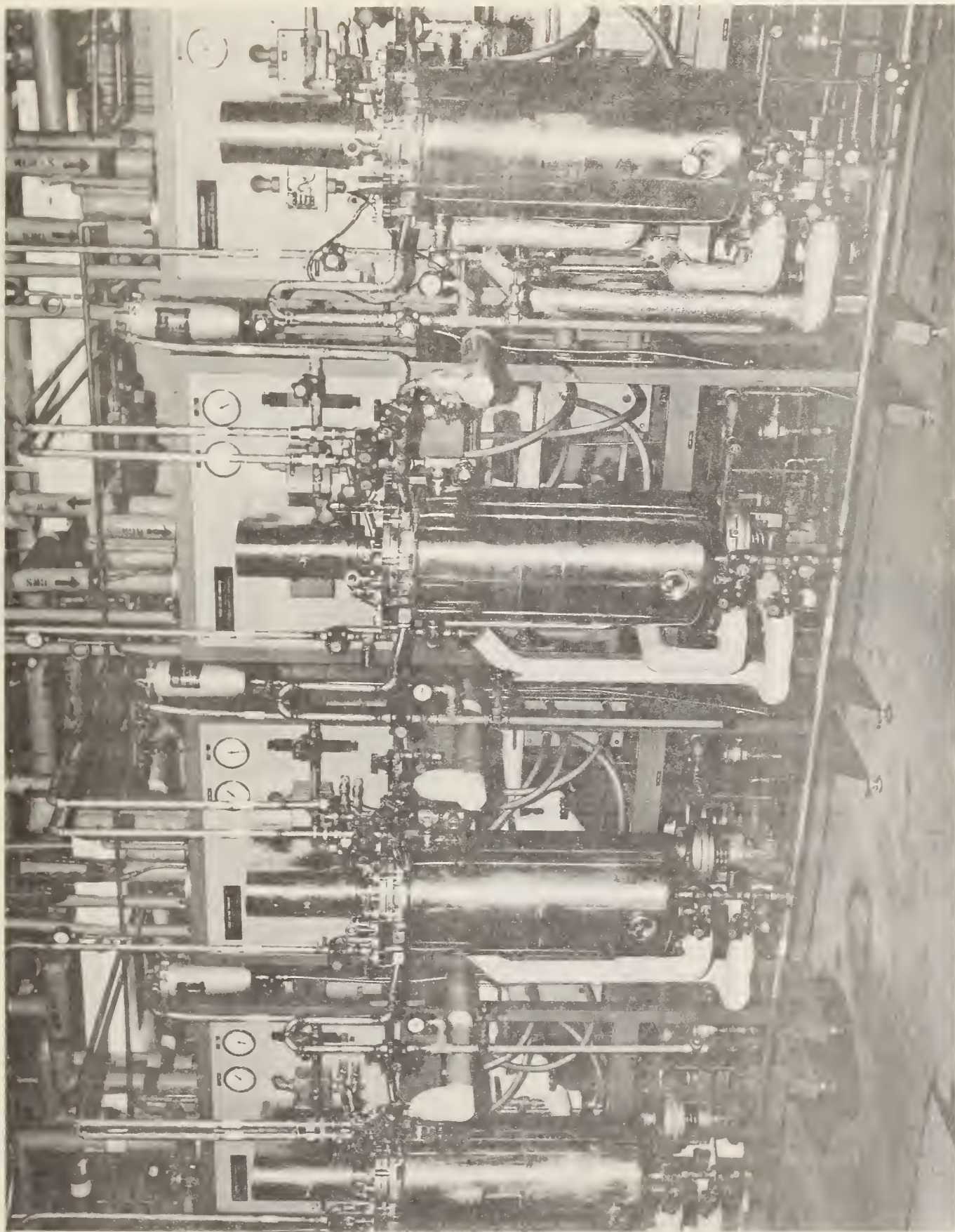
Building area - 25,700 square feet.

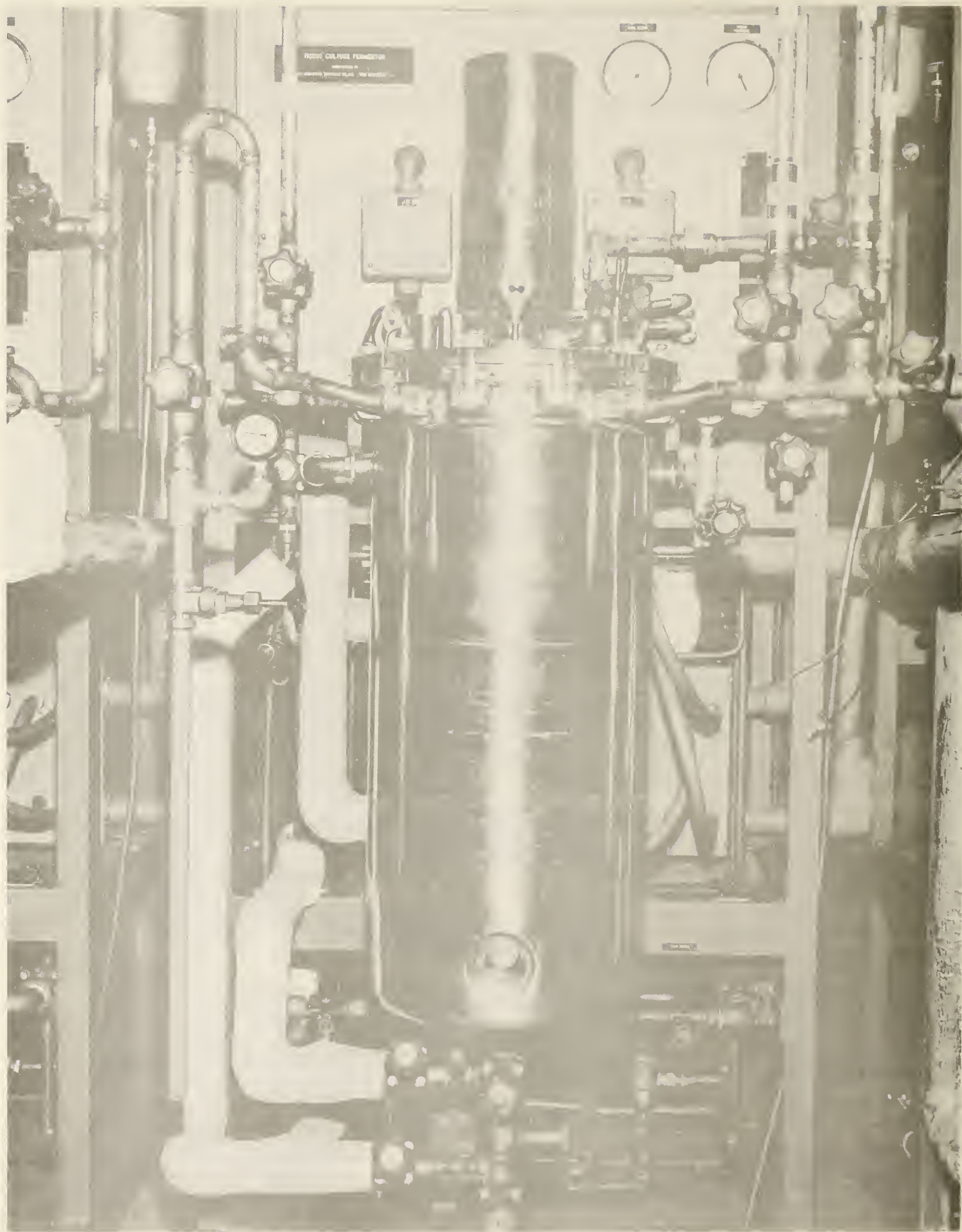
FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDGS. 431-431A

No. of Units	Facility Unit	Maximum Staff per Unit
1	Tissue Culture Pilot Plant	14
1	Bacteria Pilot Plant	<u>14</u>
Total		28

SIGNIFICANT SUPPORT EQUIPMENT: None







BUILDING 434

The process research facility in 434 contains about 18,000 square feet and is provided with egg receiving, egg holding, egg inoculating, egg incubating, and candling, egg harvesting, processing and filling - all within appropriate enclosures to ensure safety to research personnel. The various pieces of equipment within the enclosed line are not sized one in relation to the next as in a production facility, but rather are sized each to provide desired data on its operation. The plant has a 9600 egg holding capacity. The building contains laboratory facilities for production and testing of inoculum and for such tests as are necessary to insure control and understanding of process variables. The building also contains packaging facilities, inclosed in Class III cabinets. See Building 467 for other associated labs.

Building area - 18,500 square feet.

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 434

No. of Units	Facility Unit	Maximum Staff per Unit
1	Egg Culture, Virus Pilot Plant	12

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 472 - 433

Building 433 was originally designed as a bacterial nutrition laboratory. In 1952-54, Building 472 was constructed adjacent to Bldg. 433 for the production of relatively large quantities of non-pathogenic bacteria. The two buildings were connected and now constitute a single facility. Driers and other processing equipment are housed in the older section (433).

The combined facility contains 9 fermentors, ranging in size from 1000 gallons to 100 gallons, a process control laboratory, refrigerated storage, a freeze-drier, an ice pelleter, and other processing equipment.

This facility is ideal for the production of pilot quantities of biological pesticides or for supplying non-pathogenic bacterial cells for biochemical studies in quantities of 50 pounds or less. It might also be useful for the production of rare chemicals by fermentation.

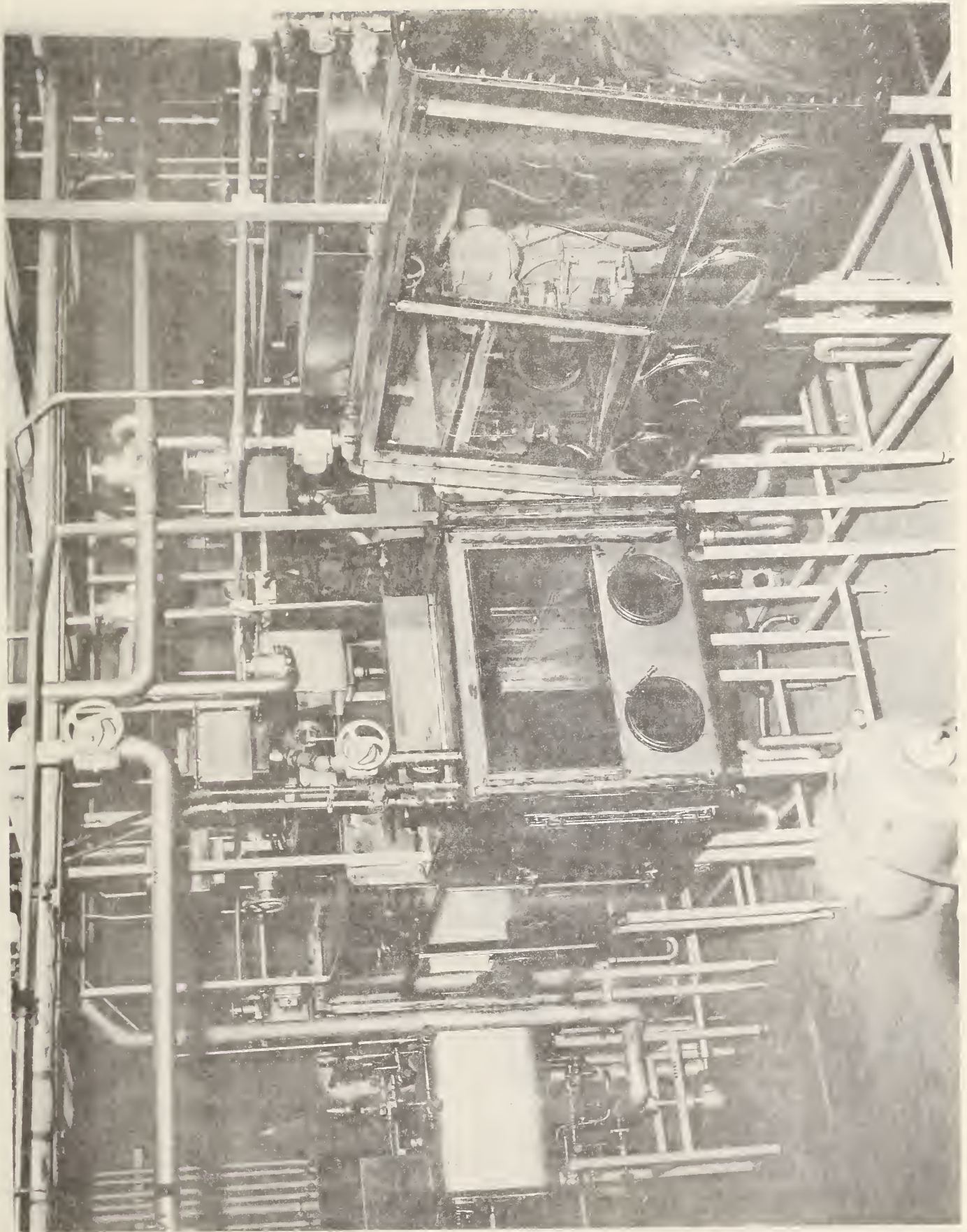
Building area - 12,300 square feet.

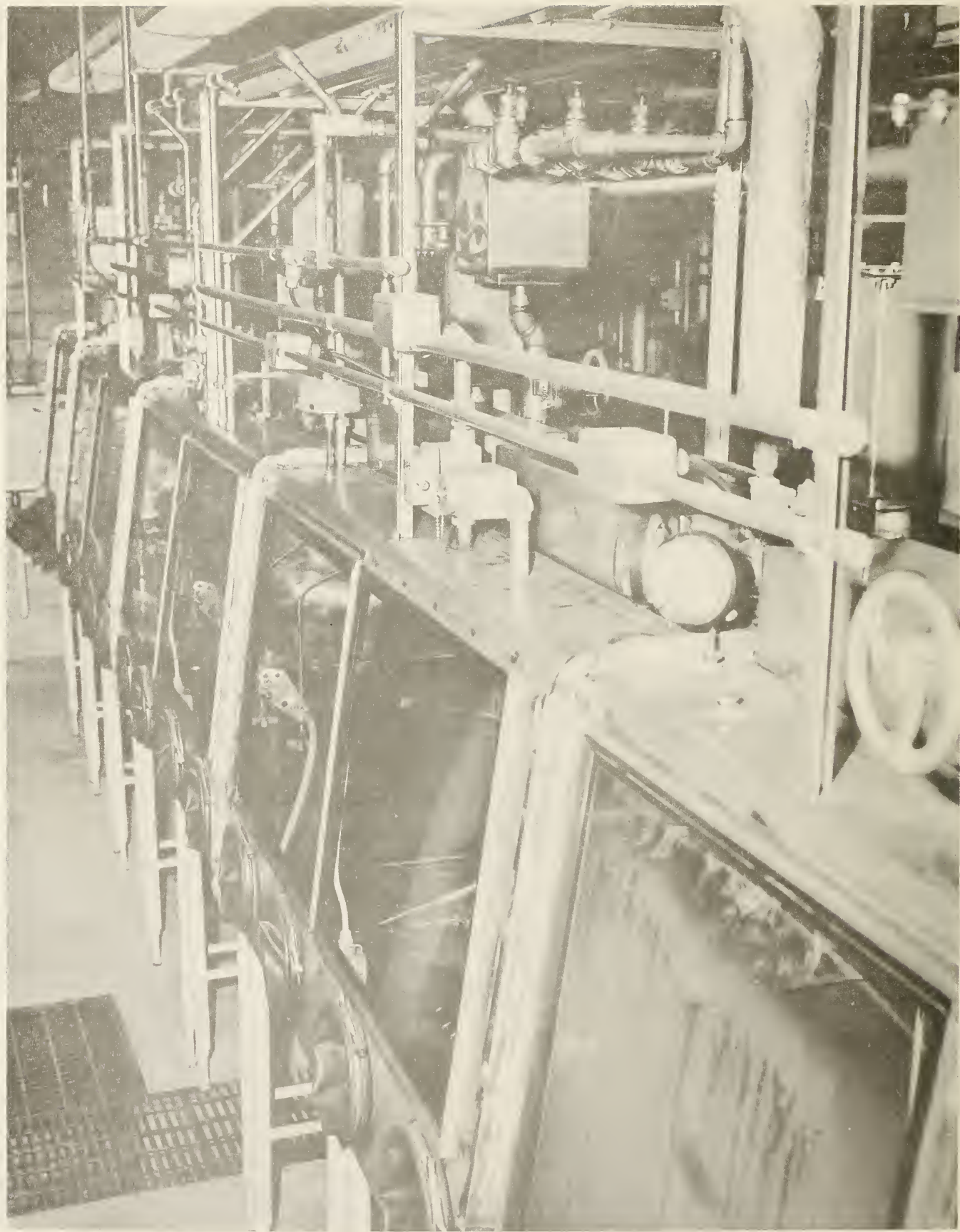
FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDGS. 472 & 433

No. of Units	Facility Unit	Maximum Staff per Unit
1	Simulant Production Unit	14

SIGNIFICANT SUPPORT EQUIPMENT:

This plant contains driers and mills normally used in connection with simulant production. However, these pieces of equipment could be used separately from fermentation equipment.





BUILDING 1301 - 1302

This is a modern complex of plant pathology and plant physiology laboratories (1301). Attached to these laboratories are nine 11' x 14' plant growth rooms (1302) with programmable control of relative humidity (± 5 per cent between 50 and 95 per cent of saturation), temperature control ($\pm 3^{\circ}\text{F}$ between 50° and 110°F), and light intensity control (to 2800 foot-candles). The laboratories are not air-conditioned. The combined area of the two buildings is 40,000 square feet.

The following functions are performed in these buildings and in related greenhouses and adjacent fields:

Collect and maintain plant pathogens from world-wide sources.

Do basic research on plant diseases, establishing host-parasite environment interrelationships.

Genetic investigation of plant pathogens.

Nutrition of plant pathogens.

Susceptibility of foreign crop plants to races of pathogens.

Epiphytotic studies.

Defoliation studies.

Plant growth inhibition studies.

Building Area - 40,000 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDGS. 1301-1302

No. of Units	Facility Unit	Maximum Staff per Unit
9	Plant Physiology Laboratory	2
1	Plant Pathology Laboratory	1
11	Plant Pathology Laboratory	2
2	Plant Pathology Laboratory	3
1	Biochemistry Laboratory	2
3	Chemical Formulation Laboratory	<u>2</u>
Total		55

SIGNIFICANT SUPPORT EQUIPMENT:

1	Radioisotope Laboratory
9	Controlled Environment Growth Room
1	Dark Room
3	Inoculation Rooms
8	Greenhouses

BUILDING 374

This is a unique greenhouse facility for growth and infection of plants with pathogens which must be contained to protect native crops. It consists of greenhouses and supporting laboratories in a single structure, with air movement controlled by fans, filters, and dampers. The temperature of the greenhouses is controlled and facilities are provided for decontamination of all who leave the area. The area contains 15,600 square feet, is air-conditioned with independent control of each of the four greenhouses. All special utilities are provided including underground sewer line to the sewage sterilization plant. In addition, tanks are provided for special heat or chemical sterilization of liquids prior to leaving the building.

Building Area - 18,400 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 374

No. of Units	Facility Unit	Maximum Staff per Unit
1	Exotic Pathogen Inoculum Production Unit	4
1	Exotic Pathogen Inoculum Production Unit	<u>5</u>
Total		9

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDING 325

This building contains a process research facility for production of plant pathogens. The building is adequate for this purpose but it is poorly equipped to perform the prescribed mission. In addition to the "pilot plant" area, there are several rather poorly equipped laboratories in the building.

Building Area - 12,800 ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 325

No. of Units	Facility Unit	Maximum Staff per Unit
1	Plant Agent Pilot Plant	18

SIGNIFICANT SUPPORT EQUIPMENT: None

BUILDINGS 318, 319, 323, 324, 1303, 1304, 1305,
1306, 326

These are eight greenhouses and a soil preparation building. Each greenhouse range consists of approximately 3,000 square feet. An isolated chemical spray room is provided with filtered air exhaust and connected to the greenhouses. All soil preparation, mixing, sterilization, and potting operations are carried out in these facilities. Selected plants are propagated for use in physiology and pathology programs.

Combined Area - approximately 25,000 ft²

ANIMAL FARM DIVISION

The Animal Farm facilities at Fort Detrick consist of 24 separate animal breeding and holding buildings and a large central building or "headhouse." There is also a large "corral" area for holding larger laboratory animal species such as horses, cattle and sheep.

The Animal buildings are of cinder block construction, 62' x 32', each containing three animal rooms which are separately air conditioned with good control of temperature and humidity.

The headhouse is a large two story structure 142' x 52' which contains on the first floor a central cage washing and storage area, offices and a diagnostic microbiology laboratory. The upper level is used for the storage of large quantities of animal feed and bedding.

Production Capability

The Animal Farm Division produces mice, guinea pigs and rabbits, and conditions rhesus monkeys.

Mice

Present Annual Production	500,000 - 600,000
Capability	800,000 - 900,000

Mouse Litters (1-3 days old)

Present Annual Production	40,000 - 50,000
Capability	50,000 - 65,000

Swiss mouse, Webster Strain, random bred, closed colony since 1950. Caesarian derived, specific pathogen free. Small germ free colony maintained but have large capability.

Guinea Pigs

Present Annual Production	20,000 - 25,000
Capability	40,000 - 50,000

Hartley strain, random bred, closed colony since 1952. Caesarian derived in 1961. Over 250,000 guinea pigs produced since 1954.

Rabbits

Present Annual Production	1,200 - 1,500
Capability	2,000 - 2,500

New Zealand white rabbits, closed colony since 1954.

Monkeys

Present Annual Production (Conditioning)	2,000 - 3,000
Capability	3,000 - 4,000

Rhesus monkeys are received directly from India and conditioned for a period of at least three months before being issued to the laboratories. About seven (7) other species of sub-human primates, including the chimpanzee, have been conditioned in this facility.

ANIMAL FARM DIVISION

STAFFING

41

TECHNICAL LIBRARY

BLDG 426

STAFFING

44

BUILDING 1422

This houses offices for mathematicians and programmers as well as a 1004 computer with supporting facilities and a CDC-3150 computer with supporting facilities.

Building Area - 9,450 ft².

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 1422

No. of Units	Facility Units	Maximum Staff per Unit	
10	Mathematics Offices	Total	<u>1</u>
			10

SIGNIFICANT SUPPORT EQUIPMENT:

1	1004 Computer with support facilities
1	CDC-3150 Computer with support facilities

BUILDING 426

The Technical Library in this building contains more than 50,000 books and monographs, 40,000 technical reports and over 1,000 periodicals. The library provides such services as translation reproduction, preparation of research bibliographies, literature searches or surveys and location of maps, charts, and microfilm. This building also houses offices and the largest conference room on the post, seating over 100 people.

Building Area - 10,900 Ft²

BUILDING 550

Building 550 contains well equipped laboratories for support of Fort Detrick's safety program. All laboratories are constantly assessed to insure that safety equipment is operating properly and that pathogens do not escape. These samples are assayed in 13 laboratories housed here. In addition, there are two laboratories for assay of samples which would not contain human pathogens.

Building Area - 20,000 ft².

BUILDING 525

This building is used for the assembly and test of optical and electronic equipment proposed for the rapid detection and identification of pathogenic aerosols. It is not suitable to contain pathogens. It contains in addition to seven assembly laboratories, a small machine shop and electronics shop.

Building Area - 6,480 Ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 525

No. of Units	Facility Unit	Maximum Staff per Unit
6	Physicochemical Laboratory, Clean	2
7	Detection Instruments, Assembly and Test Laboratory, Clean	2
1	Microscopy Laboratory	<u>2</u>
	Total	28

SIGNIFICANT SUPPORT EQUIPMENT:

1	Machine Shop, Clean, 2-man
1	Electronics Shop, Clean, 2-man

BUILDING 521

This building contains laboratories and facilities for challenging protective masks, clothing, and shelters with harmless simulants. It contains supporting biochemistry and microbiology laboratories.

Building Area - 11,490 Ft²

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 521

No. of Units	Facility Unit	Maximum Staff per Unit
1	Man-Exposure Chamber, Protective Equipment, Clean	4
2	Biochemistry Laboratories, Clean	2
1	Bacteriology Laboratory, Clean	4
3	Protective Equipment Test Laboratory, Clean	3
1	Protective Equipment Test Laboratory, Clean	6
1	Detection Instruments, Assembly and Test Laboratory	4
Total		31

SIGNIFICANT SUPPORT EQUIPMENT: None

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 350

No. of Units	Facility Unit	Maximum Staff per Unit
1	Materials Laboratory, Clean	2
3	Mechanics Laboratory, Clean	2
1	Mechanics Laboratory, Clean	<u>3</u>
Total		11

SIGNIFICANT SUPPORT EQUIPMENT:

1	Instrument Laboratory
1	Assembly Area
1	Machine Shop, 11-man
1	Impact Machine

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDGS. 321-322

No. of Units	Facility Unit	Maximum Staff per Unit
11	Engineering Office	2
2	Engineering Office	<u>3</u>
Total		28

Significant Support Equipment:

1	Drafting Room with Printer
1	Subsonic Wind Tunnel
1	Blowdown Wind Tunnel
1	Aerobiology Silo (permit recovery of all particulates in aerosol)
1	Munitions shipping and loading facility
14	Munitions magazines
1	Beckman-Whitley Camera
1	Interior Ballistics Facility
1	Tracking Range

FACILITY UNITS AND MAJOR SUPPORT EQUIPMENT, BLDG. 432

No. of Units	Facility Unit	Maximum Staff per Unit
6	Bacteriological Laboratory	2
1	Bacteriological Laboratory	<u>3</u>
Total		15

SIGNIFICANT SUPPORT EQUIPMENT: None

